

Organizational constraints and performance: an indirect effects model

Organizational
constraints

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Abstract

Purpose – Surprisingly, most studies have failed to demonstrate a strong correlation between organizational constraints (conditions at work that make doing a job difficult) and job performance. The purpose of this paper is to challenge the view that constraints are a direct barrier on performance and take an alternative approach whereby constraints have an indirect effect via decreased motivation and increased workload. Further, differential effects of various constraints are examined.

Design/methodology/approach – Qualitative and quantitative data were collected from 660 engineers licensed in the state of Florida using a single online survey.

Findings – Qualitative results showed that the most commonly experienced constraints were from coworkers and organizational rules and procedures. Constraints identified as having a greater detrimental effect on motivation are from the supervisor, and organizational rules and procedures. Quantitative results supported an indirect effects model that includes an indirect path via motivation, and a path via workload, which had a curvilinear component.

Originality/value – This is one of few studies to explain the relationship between constraints and performance, rather than simply estimate it. The use of mixed methods allows us to gain an in-depth understanding of constraints, and the convergence of findings across the methods increases confidence in this study's results.

Keywords Motivation, Stress, Job performance, Job demands

Paper type Research paper

Introduction

Organizational constraints are defined as the aspects of the immediate work environment that inhibit the translation of motivation and abilities into effective performance (Peters and O'Connor, 1980). Common examples of constraints include insufficient information or equipment, and interruptions or inadequate help from other people. Constraints were originally hypothesized to limit the maximal level of performance, thus having a stronger effect on workers high in ability and motivation (Peters and O'Connor, 1980; Guzzo and Gannett, 1988). Whereas early laboratory studies supported the performance-inhibiting role of constraints, research in field settings revealed only small and often non-significant correlations (Gilboa *et al.*, 2008; Spector and Jex, 1998; Villanova and Roman, 1993;



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Pindek and Spector, 2016a). The inconsistent results between laboratory and field suggest perhaps a more complicated mechanism is in play, but very few studies have examined how constraints impact performance, and whether these effects are uniform for different constraints. Recently, Pindek and Spector (2016a) examined possible explanations for the low correlation between constraints and performance in a series of studies that focused on methodological and perceptual moderators as explanations for the weak relationship between organizational constraints and performance. The current study argues that it is also imperative to consider the specific constraints that employees face and examine their effects on more proximal outcomes (i.e. motivation and workload), that in turn affect performance. This is in contrast to the traditional view of constraints as a direct performance inhibitor.

The current paper therefore has two main contributions: First, combining qualitative and quantitative methods on a large sample of employees, allows us to gain a deeper understanding of the impact that various constraints have on employee performance. Second, challenging the original conceptualization of constraints as a direct barrier to performance, and examining motivation and workload as possible mediators, helps bridge the gap in the literature between the strong theoretical link and the surprisingly weak empirical correlation between constraints and performance (mean $r = -0.07$, $k = 17$, $n = 8,764$, when performance was not self-rated; mean $r = -0.16$, $k = 5$, $n = 1,460$, when performance was self-rated; Pindek and Spector, 2016a). This goes beyond Pindek and Spector's (2016a) tests of attenuating factors for the constraints–performance relationship.

Part 1 – an in-depth look at constraints

The majority of prior literature viewed constraints as a general, homogenous construct, which has typically been examined using quantitative methods. However, the organizational constraints construct was not initially designed as being homogeneous. In their conceptual work, Peters and O'Connor (1980) described eight distinct variables they included as situational elements relevant to performance. These variables were later captured by the 11-item organizational constraints scale (OCS) (Spector and Jex, 1998) that has been used in over 70 percent of constraints studies included in a recent meta-analysis (Pindek and Spector, 2016b). Constraints captured by this instrument include poor or lacking equipment, rules, inadequate training or instructions, the supervisor, and coworkers. There have been few previous efforts to examine the differential relationships that various constraints have with other variables. Perhaps the most prominent attempt by Liu *et al.* (2007) examined the cultural differences in prevalence rates between Americans and Chinese when separating interpersonal constraints from more task-oriented constraints. This is one possible way to discuss how different types of constraints can vary in their prevalence and effects.

Another lens through which differential effects for constraints may be considered is based on work by LePine *et al.* (2005). They introduced a two-dimensional stress model, which is focused on the appraisal of stressors as a hindrance (a threat, de-motivator or “bad stress”) vs a challenge (a motivator or “good stress”), having differential correlations with strain, motivation and performance. A recent study that applied a challenge-hindrance approach to constraints (Pindek and Spector, 2016a) found support for a more complicated view of constraints as having both challenge and hindrance components. Pindek and Spector (2016a) argued, but did not test, that some constraints are perceived as hindrance stressors (e.g. lacking equipment or supplies), while other constraints can be motivating and have a more challenging effect (e.g. inadequate training can lead some workers to invest more effort in developing skills on their own). Indeed while the original work by LePine *et al.* (2005) considered constraints to be a hindrance, there have been other studies examining challenging aspects of at least some constraints. Dealing specifically with resource scarcity

(one dimension of constraints), Sonenshein (2014) demonstrated how limited resources can foster creativity. In that sense, constraints can in fact be challenging and enhance motivation to overcome the difficulty. In the same vein, Fritz and Sonnentag (2009) found that constraints predict taking charge at work, presumably because constraints represent a suboptimal situation that can be changed through proactive behavior. It is therefore possible that some constraints are not as harmful to employees' well-being and performance. The current study uses a qualitative approach to gain a deeper understanding of constraints, one that does not assume that all constraints are equal in their effects.

While most organizational constraints research is conducted using quantitative methods (Spector and Pindek, 2016) a more inductive, qualitative approach presents an alternative where participants can be asked various questions regarding their job experiences (Keenan and Newton, 1985). Such qualitative data can provide detailed information about which constraints are more important or prevalent (Liu *et al.*, 2007), and what the effects of those different constraints might be. The use of open-ended questions in an inductive manner can reveal explanations that were not previously hypothesized. This is particularly useful in the case of the relationship between constraints and performance, which was assessed in many previous studies, but for the most part it was left unexplained.

Several researchers have used qualitative approaches to study job experiences. For example, Motowidlo *et al.* (1986) examined the effects of stressful work events on stress, affect and performance decrements in nurses. Other qualitative studies examined types of stressors, reactions and consequences (e.g. Narayanan *et al.*, 1999; Liu *et al.*, 2007; Parkes, 1985; Keenan and Newton, 1985; Mazzola *et al.*, 2011). In all these studies, the qualitative information obtained provided unique insights into the effects of stressful work experiences. A similar technique is therefore employed in the current research to gain insight on the following questions:

RQ1. What are the most constraining aspects of the work environment?

RQ2. Are the different constraining aspects of the work environment related differentially to motivation and performance?

Part 2 – an indirect relationship between constraints and performance

The mediating role of motivation

In their discussion of the pitfalls of studying the constraints–performance relationship, Bendoly and Hur (2007) argue that researchers may need to go beyond the traditional view of direct effects that represent a mechanistic view of the capabilities of workers and the extent to which their resources enabled them to use those capabilities. When trying to explain the weak association between constraints and performance, one approach is to consider other performance indicators, such as counterproductive behaviors that have stronger relationships with constraints (e.g. Clark and Walsh, 2016). An alternative approach considers the negative effect that constraints have on motivation, and subsequently on task performance. This latter approach is employed in the current research. As mentioned earlier, LePine *et al.* (2005) mapped constraints to be, overall, a hindrance stressor in their two-dimensional stress model. Hindrance stressors are expected to potentially harm personal growth or gain, and to trigger an array of reactions, including negative emotions and withdrawing from the situation as a means of coping.

When considering a conceptually similar construct to motivation, i.e., work engagement (Gagne and Deci, 2005) and using the job demands–resources model as an organizing framework (Bakker *et al.*, 2008), it is evident that engagement is associated with job performance: engaged individuals are better performers, and job resources that promote performance (e.g. coaching and performance feedback from the supervisor) are

some of the best predictors of engagement. Because motivation and engagement are related constructs, constraints, which are conditions at work that make it difficult to complete the job tasks, would therefore be expected to impact performance via lower motivation because they represent not only an increase in demands but also a lack of resources (e.g. constraints include lack of training and poor equipment, which can be considered poor resources). It is this combination of high demands and low resources that is demotivating (Bakker *et al.*, 2007).

Therefore, the current study proposes an indirect effects model of the effects of constraints on performance. As part of this model, there is a hypothesized significant indirect path in the constraints–performance relationship through motivation. Furthermore, an overall negative effect on motivation, as is supported by generalized meta-analytic findings (e.g. Pindek and Spector, 2016a), is expected:

- H1.* There is an indirect path from constraints to performance via motivation. Specifically, constraints are negatively related to motivation, and motivation is positively related to performance.

The mediating role of workload

Workload refers to the volume, pace and difficulty of work (Spector and Jex, 1998). Since organizational constraints interfere with performance by definition, and result in employees having to extend more effort or spend more time in order to get their tasks done, they likely contribute to a higher workload. Some constraints are interruptions, which reduce the time employees can devote to their tasks. Other constraints, such as inadequate resources or help from coworkers, can increase the actual work that needs to be completed. There is support for a positive correlation between constraints and workload (average uncorrected r of 0.39; Pindek and Spector, 2016b), but the nature of the relationship between them has not received much attention. Constraints are expected to lead to higher workload, which serves as a mediator in the constraints–performance relationship.

Gilboa *et al.*'s (2008) meta-analysis examined both the linear relationship between role overload and job performance ($r = -0.06$), and between constraints and job performance ($r = -0.19$). One way to conceptualize workload that is too great (termed role overload, and defines as having too many expected responsibilities or activities; Rizzo *et al.*, 1970) is that it occurs when an individual perceives he or she does not have the necessary resources to deal with demands (Kahn *et al.*, 1964). According to this conceptualization, constraints (which include a lack of necessary resources) contribute to an increase in role overload, or workload. As workload increases, employees will struggle to complete tasks, and thus performance will suffer. Thus, workload is expected to mediate the organizational constraints–performance relationship:

- H2a.* There is an indirect path from constraints to performance through workload. Specifically, constraints are positively related to workload, and workload is negatively related to performance.

The relationship between workload and performance is not a straightforward one, as workload should not impede performance as long as it is not too high. Accordingly, some researchers argue that a curvilinear relationship may be a more appropriate depiction of the effects of workload on performance (e.g. Bendoly and Hur, 2007). For example, Janssen (2001) found a curvilinear (inverted U-shaped) relationship between quantitative demands (similar to workload) and job performance. The inverted U pattern suggests that both workload that is too high (exceeds capacity) and workload that is too low (not challenging enough), can result in decreased performance. This non-linear relationship between workload and job performance can partially explain why there appears to be a lower

correlation (linear relationship) between the two variables. We therefore expect a curvilinear path between workload and performance:

H2b. There is a significant curvilinear path from workload to performance such that when workload is at low and high levels, performance is lower than when workload is at intermediate levels.

Method

Participants and procedure

A single online survey was used for both the qualitative and quantitative parts of the study. Participants in this study, all volunteers, consisted of 660 licensed engineers employed in Florida. Engineers were recruited through e-mails that are available from a public database. Participants were on average 53 years old ($SD = 14$), and most were men (88 percent). Their average tenure on the current job was 8 years ($SD = 11$), 91 percent were working full time and 9 percent were working part-time, and job titles and employing organization varied. The questionnaires were distributed through a web-based platform, and were part of a larger investigation. Constraints are particularly relevant to the type of work engineers do, as was demonstrated in the previous research that used open-ended questions and found that “ineffective and wasteful use of time” (similar to the definition of constraints) was a main source of stress (Keenan and Newton, 1985).

Qualitative measures

The qualitative part of the questionnaire contained three open-ended questions concerning the nature of constraints. They were preceded by the following explanation: “This is a study of situational constraints or obstacles, which are conditions at work that interfere with performing the job. These can include lacking or inadequate information, equipment/budget, services from others, or training. They could also be interruptions from others, lack of cooperation or anything that makes it difficult or impossible to do the job”. The questions were: “What aspects of your work did you find constraining?”, “How did these constraints affect your **motivation** to do your job?” and “How did these constraints affect your **actual performance**?” (Bold in original).

Two independent subject matter experts (co-authors of this report) read all the responses and independently coded them into categories that were not predetermined. After discussing the overlap between the two coders’ categories, a third subject matter expert collapsed similar categories and coded all responses again. There were some cases of disagreements in categorizations between the first two coders (6.2, 2.2 and 4.3 percent disagreement on questions 1, 2 and 3, respectively), and those disagreements were resolved by the third coder.

Quantitative measures

The participants were asked to respond to four previously developed quantitative scales. For each of the scales, the most recent workday was used as the time reference. This time reference was used because performance measures can have range restriction, particularly when they are self-rated, because selection systems attempt to weed out potential poor performers at the hiring stage, and those that are mistakenly hired are likely to then be fired. Another reason for range restriction is biases in self-appraisals. The reasoning is that an employee would be more likely to experience and be willing to report a relatively low-performance day (internal comparison) than low performance in general (external comparison). Unless stated otherwise, all items were measured on a six-point scale ranging

from 1 (“strongly disagree”) to 6 (“strongly agree”), and α reliability coefficients are reported in Table V.

Organizational constraints. The Spector and Jex’s (1998) OCS was used. The reference for the 11 items was “How difficult was it to do your job during the most recent day because of ___.” Items were measured on a four-point scale ranging from “not at all difficult” to “extremely difficult.” A sample item is “poor equipment or supplies.”

Performance. The Williams and Anderson’s (1991) subscale of in-role performance was adapted for self-assessment. Of the seven original items, one was excluded due to low factor loading in the original work (“engages in activities that will directly affect his/her performance evaluation”). A sample item is: “performed tasks that were expected of me.”

Motivation. Items from two sources were combined to measure motivation. First, we took the seven items that reflected intrinsic motivation from the Utrecht Work Engagement Scale (UWES) (Schaufeli *et al.*, 2006). A sample item is “I felt enthusiastic about my job.” The α reliability coefficient for the seven items was 0.89. The engagement scale is an appropriate measure for motivation (Ryan and Deci, 2000; Schaufeli *et al.*, 2002). Second, we wrote three items designed specifically to assess internal motivation: “I felt like doing my job today,” “I felt motivated to do my job today” and “Today I felt like I was ready to tackle obstacles on my job.” The three new items had an α reliability coefficient of 0.93. Since the resulting patterns were similar when using either the seven UWES items or the three new items, the correlation between them was 0.78, and an exploratory factor analysis with common factor analysis extraction suggested one factor based on the scree plot criterion, all ten items were combined.

Workload. The Spector and Jex’s (1998) quantitative workload inventory was used. The scale includes five items. A sample item is “My job required me to work very fast.”

Results

Qualitative results

Frequencies of responses to the open-ended questions are reported in Table I, and examples of statements that were coded into each category can be found in Appendix 1. Note that because some responses were coded as belonging to more than one category, percentages are calculated both out of the number of participants who answered the question (100 percent), and out of the total number of endorsements of categories (over 100 percent). As can be seen in Table I, the most frequently mentioned constraints are interruptions or inadequate help from coworkers (mentioned by 23 percent of the participants), organizational rules and procedures (21 percent of the participants), the supervisor or management (12 percent of the participants) and poor equipment (11 percent of the participants). These results provide some answers to *RQ1*. Furthermore, some participants (27 percent) reported a motivation decrease, some reported no effect (21 percent), and some reported an increase (18 percent). The effects on performance were mainly a decrease (53 percent of the participants) or no effect (34 percent of the participants). Few participants (1 percent) mentioned an increase in performance.

To answer *RQ2*, three χ^2 tests for categorical data (χ^2 contingency tables) were conducted using SPSS version 22.0 to establish the relationships between engineers’ perceived constraints, their effects on motivation and their effects on actual performance. Prior to conducting the χ^2 tests, every response category that was endorsed by fewer than 10 percent of the participants was excluded so we could conduct a meaningful analysis on the data. One response category was excluded from the effects on motivation question (“Make angry/frustrate”) because it was not a direct answer to that question. We also excluded participants who belonged to more than one category (though this exclusion did not change the pattern of results). Results for the three χ^2 analyses are presented in Tables II–IV. In addition to

	<i>n</i>	% ^a	% ^b	Organizational constraints
<i>Q1: Work aspects that are constraining</i>				
Co-workers (interruptions, inadequate help or cooperation)	123	22.6	27.2	
Organizational rules and procedures	116	21.3	25.7	
Supervisor or management	64	11.7	14.2	
Poor equipment or lack of money	58	10.6	12.8	
Ambiguous demands (lacking instructions or information)	46	8.4	10.2	
Difficult clients	35	6.4	7.7	
Workload	32	5.9	7.1	
Conflicting demands	29	5.3	6.4	
Inadequate training or job knowledge	16	2.9	3.5	
Other	15	2.8	3.3	
None	11	2.0	2.4	
Total	545	100.0	120.6	
<i>Q2: The effect constraints have on motivation</i>				
Decrease motivation	137	27.4	30.5	
No effect	106	21.2	23.6	
Increase motivation	92	18.4	20.5	
Anger or frustration	70	14.0	15.6	
Depression or stress	35	7.0	7.8	
Decrease in work pace	30	6.0	6.7	
Avoidance of the constraint (work on other things)	15	3.0	3.3	
Other	14	2.8	3.1	
Made unable to continue work	1	0.2	0.2	
Total	500	100.0	111.4	
<i>Q3: The effect constraints have on performance</i>				
Decrease performance	247	52.8	55.4	
No effect	157	33.5	35.2	
Decrease performance pace	28	6.0	6.3	
Overcome the constraints	16	3.4	3.6	
Other	9	1.9	2.0	
Increase performance	6	1.3	1.3	
Stress/added pressure/distraction	5	1.1	1.1	
Total	468	100.0	104.9	
Notes: Number of respondents were 452 (Q1), 449 (Q2) and 446 (Q3). ^a Percentage out of number of categorized responses (sums up to 100 percent); ^b percentage out of number of respondents (sums up to more than 100 percent because some respondents gave more than one response)				

Table I.
Frequency of responses to the open-ended questions

reporting the observed values for each cell in the contingency tables, the percentages for each cell in relation to the row total are also provided for ease of interpretation. *Post hoc* tests and effect sizes (Ferguson, 2009) were also calculated.

The χ^2 test presented in Table II indicates a significant dependency between the type of constraints and its effect on motivation ($\chi^2_{(6)} = 23.45, p < 0.01, \text{Cramer's } V = 0.23$). *Post hoc* tests using the adjusted standardized residuals with a Bonferroni correction to the *p*-values revealed that only two cells had a significantly different proportion: supervisors as a constraint was associated with an increase in motivation ($Z = 3.00, p = 0.003$), and coworkers as the constraint was associated with a decrease in motivation ($Z = -2.94, p = 0.003$). When examining the estimated proportions, organizational rules and procedures, and the supervisor/management were most often associated with reduced motivation (56 and 66 percent, respectively). For the other two categories, the chances of motivation decreasing were considerably lower. The χ^2 test presented in Table III indicates there is no dependency between the type of constraints and its effect on performance ($\chi^2_{(3)} = 0.97, p = 0.81, \text{Cramer's } V = 0.06$).

The χ^2 test presented in Table IV indicates a significant dependency between the effects of constraints on motivation and on performance ($\chi^2_{(2)} = 14.01, p < 0.01$, Cramer's $V = 0.22$). *Post hoc* tests using the adjusted standardized residuals with a Bonferroni correction to the p -values revealed that only for those who experienced a decrease in motivation there was a significant difference in effects on performance ($Z = 3.74, p = 0.0002$). Examining the estimated proportions reveals that when the effects on motivation were negative, it was much more likely (71 percent) that the effects on performance were negative as well, while when the motivational effects were positive or unchanged, the likelihood of reduced performance was 49 and 50 percent, respectively.

Quantitative results

Descriptive statistics and correlations between the variables included in the quantitative part of the study are presented in Table V. Note that constraints, motivation and

Table II.
Dependency between the type of constraints and its effect on motivation

	Increase	Effect on motivation No effect	Decrease
<i>Type of constraints</i>			
Poor equipment	5 (19%)	14 (54%)	7 (27%)
Organizational rules	12 (18%)	18 (26%)	38 (56%)
Supervisors	7 (16%)	8 (18%)	29 (66%)
Co-workers	31 (33%)	31 (33%)	32 (34%)

Notes: Total $n = 232$. The percentages shown in parentheses correspond to each type of constraints separately (rows sum to 100 percent but columns do not) and reflect the proportion of individuals who reported each category of effect on motivation. $\chi^2_{(6)} = 23.45, p < 0.01$

Table III.
Dependency between the type of constraints and its effect on performance

	Decrease	Effect on performance No effect
<i>Type of constraints</i>		
Poor equipment	23 (68%)	11 (32%)
Organizational rules	64 (66%)	33 (34%)
Supervisors	29 (59%)	20 (41%)
Co-workers	66 (62%)	40 (38%)

Notes: Total $n = 286$. The percentages shown in parentheses correspond to each type of constraints separately (rows sum to 100 percent but columns do not) and reflect the proportion of individuals who reported each category of effect on performance. $\chi^2_{(3)} = 0.97, p = 0.81$

Table IV.
Dependency between the effects of constraints on motivation and on performance

	Decrease	Effect on performance None
<i>Effect on motivation</i>		
Increase	35 (49%)	37 (51%)
No effect	49 (50%)	49 (50%)
Decrease	85 (71%)	34 (29%)

Notes: Total $n = 289$. The percentages shown in parentheses correspond to each type of motivational effect separately (rows sum to 100 percent but columns do not) and reflect the proportion of individuals who reported each category of effect on performance. $\chi^2_{(2)} = 14.01, p < 0.01$

performance are all significantly correlated. Workload is significantly correlated with constraints and performance, but not with motivation.

An indirect effects path analysis model was tested using the maximum likelihood estimator in Mplus (Muthén and Muthén, 1998–2012), using bias-corrected bootstrapped confidence intervals for the indirect effect. We chose to test a path model rather than a full structural equations model because of the formative nature of the constraints scale, and the curvilinear component in our structural model. Furthermore, this approach allows us to easily compare competing structural models without having the fit of the measurement model mask the fit of the structural model.

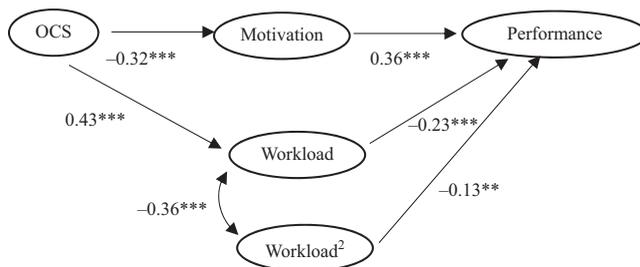
Fit statistics indicated a strong fit for our model ($\chi^2_{(4)} = 7.18, p = 0.13, RMSEA = 0.04, CFI = 0.99, TLI = 0.98, SRMR = 0.02$). The curvilinear path from workload to performance was modeled by including both workload and the squared workload term as predictors of performance. No control variables were used. All paths were significant and in the expected direction (see Figure 1). The indirect path between constraints and performance via motivation was significant (unstandardized $b = -0.19, SE = 0.04, p < 0.001, 95\% CI = [-0.26, -0.12]$), supporting *H1*. *H2a* and *H2b* received supported (an indirect path via workload, with a curvilinear component; unstandardized $b = -0.24, SE = 0.06, p < 0.001, 95\% CI = [-0.36, -0.13]$). The workload–performance relationship was curvilinear, but did not form an inverse U shape. Rather, it was shaped as the right half of an inverse U (see Figure 2). Therefore, *H2b* was not supported.

To increase our confidence in the proposed model, a series of theoretically plausible competing models were tested. The first alternative model (Alternative model 1) is similar to

Variable	<i>N</i>	<i>M</i>	SD	1	2	3	4	5
(1) Constraints	660	1.76	0.52	(0.82)				
(2) Workload	598	4.07	1.13	0.42	(0.87)			
(3) Performance	596	5.10	0.84	-0.29	-0.23	(0.83)		
(4) Motivation	591	4.33	1.02	-0.32	-0.11	0.38	(0.92)	
(5) Age	525	53.10	13.68	-0.15	-0.26	0.10	0.22	
(6) Gender	535	1.12	0.32	0.00	0.09	-0.11	-0.11	-0.27

Table V. Descriptive statistic and correlations between the variables

Notes: α values are shown in the diagonal. Correlations with an absolute value > 0.11 are $p < 0.01$; correlations with an absolute value > 0.09 are $p < 0.05$. Gender had the values of 1 (men) and 2 (women)



Notes: $n = 601$. The reported path estimates are standardized. $Workload^2$ is the squared workload term, representing the curvilinear component of the relationship. The variance explained for performance is $R^2 = 0.20, p < 0.001$. ** $p < 0.01$; *** $p < 0.001$

Figure 1. The final indirect effects model

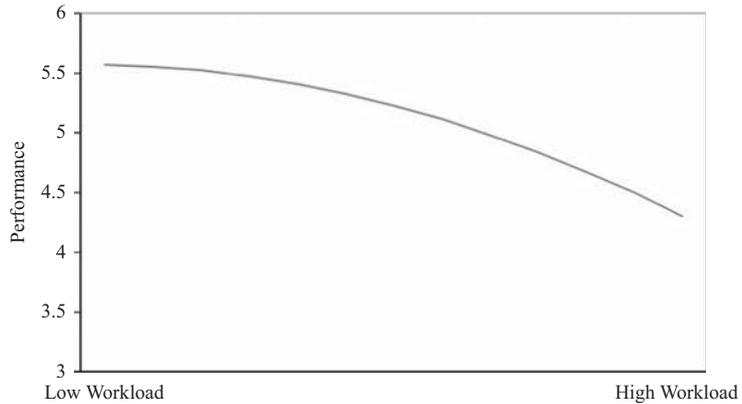


Figure 2.
The quadratic effect
of workload
on performance

the hypothesized model but does not include the curvilinear workload component. This model had good fit ($\chi^2_{(2)} = 8.56$, $p < 0.05$, RMSEA = 0.07, CFI = 0.98, TLI = 0.94, SRMR = 0.03), only slightly worse than the hypothesized model. However, we retain our proposed model because it provides additional information and has a better overall fit. The second alternative model (Alternative model 2) is a single mediation chain whereby constraints lead to workload, then leading to motivation and then to performance. This model had poor fit ($\chi^2_{(3)} = 88.33$, $p < 0.001$, RMSEA = 0.22, CFI = 0.72, TLI = 0.44, SRMR = 0.11). The third alternative model (Alternative model 3) is a single mediation chain whereby workload leads to constraints, then leading to motivation, and then to performance. This model had poor fit ($\chi^2_{(3)} = 32.83$, $p < 0.001$, RMSEA = 0.13, CFI = 0.90, TLI = 0.80, SRMR = 0.06). Fit statistics for the proposed model as well as the three alternative models are presented in Table VI.

Additional analysis

In addition to testing the hypotheses as part of a model, the quantitative data allowed replicating some of the findings from the qualitative part. One replication was of the finding that certain types of constraints that were deemed more harmful to employees' motivation (organizational rules and procedures, and the supervisor/management) and other constraints were less harmful to motivation (interruption or inadequate cooperation/help from coworkers, and poor equipment or lack of money). The other replication was of the non-significant differences between the constraints types and their effect on performance in the qualitative part.

In order to do that, two subject matter experts examined the 11 items from the OCS scale (Spector and Jex, 1998) and chose the items that appropriately mapped onto one of the four most commonly reported constraints from the qualitative results. This mapping was done in order to allow a direct replication of significant and non-significant differences between constraints in their relationship with motivation and performance. There was 100 percent

Model	χ^2	df	p	RMSEA	CFI	TLI	SRMR
Hypothesized model	7.18	4	0.13	0.04	0.99	0.98	0.02
Alternative model 1	8.56	2	0.01	0.07	0.98	0.94	0.03
Alternative model 2	88.33	3	0.00	0.22	0.72	0.44	0.11
Alternative model 3	32.83	3	0.00	0.13	0.90	0.80	0.06

Table VI.
Model fit indices for
path analysis models

agreement between the experts on the categorization of items shown in Table VII. Therefore, Items 2 and 4 (rules and management) were expected to have a stronger relationship with the quantitative measure of motivation than items 1, 3 and 5 (equipment and interruptions or inadequate help). No significant differences between the correlations of the OCS items with performance were expected. As seen in Table VII, all correlations are significantly different from 0 ($p < 0.05$). The test for differences between specific pairs of the (dependent) correlations using an asymptotic z -test (Steiger, 1980; Hoerger, 2013; Lee and Preacher, 2013) supported our predictions. For correlations with motivation, Item 2 (which had the lowest correlation with motivation among Items 2 and 4, $r = -0.28$) was compared to Item 3 (which had the highest correlation with motivation among Items 1, 3 and 5, $r = -0.18$). Since this is testing for differences between the pair of correlations that are closest to each other, if this pair has a significant difference, then all other pairs would be significantly different from each other as well. Items 2 and 3 are significantly correlated with each other ($r_{2,3} = 0.33$, $p < 0.005$), but their relationships with motivation are significantly different ($Z = 2.18$, $p < 0.05$). Therefore, there is support in the quantitative data to the finding that organizational rules and procedures, and the supervisor/management are more harmful to motivation than interruption or inadequate cooperation and help from coworkers, and poor equipment or lack of money.

For correlations with performance, Item 5 (which had the lowest correlation with performance, $p = -0.10$) was compared to Item 4 (which had the highest correlation with performance, $p = -0.18$). Since this is testing for differences between the pair of correlations that are the farthest from each other, if this pair has a non-significant difference, then all other pairs would not be significantly different from each other as well. Items 4 and 5 are significantly correlated with each other ($r_{4,5} = 0.21$), but their relationships with performance are not significantly different ($Z = 1.57$, $p = 0.12$). Therefore, there is no support in the quantitative data for differential effects of different types of constraints on performance. This replicates the qualitative results for this relationship.

Discussion

This research utilized a mixed-methods approach to gain a better understanding of the nature of constraints and its indirect relationship with performance. The qualitative part examined constraints in depth, and the quantitative part replicated and expanded on those results. Specifically, we demonstrated how different types of constraints might have both direct and indirect effects on performance.

Differential effects of types of constraints on motivation

This qualitative part of the study focused on examining organizational constraints in depth. First, a qualitative method (open-ended questions) was used to assess which constraints were most frequently reported. The two most prominent constraints were interruption or

Constraint category from qualitative responses	OCS item	Performance	Motivation
Co-workers (interruptions, inadequate help or cooperation)	(3) Other employees	-0.16**	-0.18**
Organizational rules and procedures	(2) Organizational rules and procedures	-0.17**	-0.28**
Supervisor or management	(4) Your supervisor	-0.18**	-0.33**
Poor equipment or lack of money	(1) Poor equipment or supplies	-0.11*	-0.08*
	(5) Lack of equipment or supplies	-0.10*	-0.08*

Notes: $n = 593$ (listwise). * $p < 0.05$; ** $p < 0.01$

Table VII.
OCS item correlations
with performance and
motivation

inadequate cooperation and help from coworkers, and organizational rules and procedures, each being mentioned by over 20 percent of the participants. Two more constraints were mentioned by over 10 percent of the participants: their supervisor or management, and inadequate material resources (poor equipment or lack of money). Furthermore, the dependency between the type of constraints reported and their perceived effect on the participants' motivation and performance was examined. Of the four types of constraints mentioned most often, organizational rules and procedures, and the supervisor/management were both associated with a greater likelihood of decreased motivation. However, all constraints had a similar likelihood of being associated with lower performance levels. A comparison of the two types of constraints that are more likely to result in decreased motivation with the other constraints shows the constraints that negatively affect motivation (organizational rules and procedures, and the supervisor/management) are more directly representative of the psychosocial aspects of the organization and its culture rather than the more physical aspects of the environment, such as inadequate equipment.

When looking at the differential effect that type of constraints has on motivation and performance, the results from the qualitative part were perfectly replicated using quantitative data. Specifically, two types of constraints (organizational rules and procedures, and the supervisor/management) had a larger correlation with participants' motivation than did the other constraints. Conversely, all types of constraints had a similar relationship with performance levels. The perfect replication of these results across both qualitative and quantitative data increases our confidence that these two constraints truly are more harmful to employees' motivation. This could be because management and organizational rules more directly represent the psychosocial aspects of the organization and its culture than constraints such as poor supplies or interruptions from coworkers, and therefore might be more easily attributed to organizational injustice. Future studies may examine whether these specific constraints have additional harmful effects on motivation through other organizational characteristics, such as lower organizational justice perceptions (justice perceptions have been shown to relate to performance via motivation, e.g. Zapata-Phelan *et al.*, 2009).

The indirect constraints–performance relationship

The mechanisms through which constraints affect performance have not received much empirical attention, most likely because constraints were originally viewed as a direct barrier to performance (Bendoly and Hur, 2007; Peters and O'Connor, 1980). In this research, a more comprehensive model is advocated, whereby constraints indirectly affect performance via motivation and workload. Both the qualitative and quantitative analyses in this research supported these indirect effects. When responding to the open-ended questions, the largest group of respondents (30.5 percent) noted that constraints were a de-motivator for them. However, another substantial group of participants (20.5 percent) indicated constraints actually increased their motivation to find solutions and complete their tasks despite whatever constraints they were encountering. Furthermore, while most participants (55.4 percent) indicated that constraints had a negative effect on their performance, they were much more likely to do so if they had indicated in the previous question that constraints were a de-motivator. This pattern of results is consistent with an indirect effect via motivation. This same path was significant in the model tested using quantitative methods.

The quantitative model provided support for an indirect effect for constraints on performance via workload, in addition to the indirect effect via motivation. Specifically, constraints increase the level of workload, and workload is negatively related with performance, particularly at very high levels of workload, as it is then that employees become overloaded, which hurts their ability to complete their tasks efficiently. We found

evidence that the workload to performance path was not linear, as the decrease in performance accelerated as workload increased. However, there was no evidence to support the expected decrease in performance associated with the lower levels of workload.

Strengths, limitations and contributions of the study

Our use of a mixed-methods approach in examining the constraints–performance relationship is a strength of this research, which allowed us to address the role of motivation using dissimilar methods that converged in their findings. Specifically, both the qualitative and quantitative analyses were consistent in identifying those specific constraints that had the greatest negative effect on motivation, and in indicating an indirect effect of constraints on performance via motivation. Another strength of the current study is the relatively large sample, particularly for a qualitative analysis. This allowed us to get a wide variety of responses to our open-ended questions, including responses with relatively low base rates. On the other hand, as all our participants were sampled from a population of engineers licensed in Florida, the ability to generalize to other populations is limited.

One important limitation of the current study is that its cross-sectional nature limits our ability to draw conclusions regarding time precedence. It is also an important limitation in examining the mediation effects (Stone-Romero and Rosopa, 2008). However, the types of questions used in the qualitative investigation allowed gleaning the process as it is perceived by the participants, although one must recognize that respondents were asked to make attributions that might or might not be completely accurate. Another issue is the concern that common method variance is inflating the observed correlations. This concern, however, is mitigated to a large extent by the small and non-significant correlation ($r = -0.11$) between two of the variables: workload and motivation, suggesting that there is not a constant inflation effect on these correlations (Lindell and Whitney, 2001). Furthermore, the choice of using self-reports of performance and the most recent day at work as the time reference were an attempt to disattenuate the constraints–performance relationship (Pindek and Spector, 2016a), but risk some information loss. Finally, it is unlikely that we have captured the entire complexity of the process by which constraints affect performance. There are other possible variables that may serve as mediators or moderators in this complex process. One possible variable is conscientiousness (i.e. a personality trait capturing ambitiousness, responsibility and ethical behavior) might have direct and moderating effects. For example, individuals high on conscientious and low on neuroticism tend to be better at dealing with stressors such as constraints and workload (Bowling and Eschleman, 2010), and their performance may not suffer as for those low on conscientiousness.

The main theoretical contribution of the paper is in highlighting that constraints are not simply a direct technical/mechanical barrier limiting performance. Rather, employees who encounter constraints experience a decrease in motivation and an increase in the workload, which help explain the negative impact that constraints have on performance. Moving away from a mechanistic view of constraints and adopting an approach that is more focused on the experiences that employees have when they encounter constraints on the job provides some much-needed insights on how organizations may better manage their employees' work environment and performance.

Practical implications

It is certainly not surprising that constraints due to inadequate resources would adversely affect job performance. It is also likely that in such cases, managers would note that they do not have the resources to give. Perhaps the most important contribution of this study is to show that the sorts of constraints that are most common and harmful in terms of motivation do not arise from inadequate resources, but rather from colleagues, managers,

and organizational rules and procedures. These are issues that can be addressed relatively cheaply by focusing attention on sound organizational practices, especially leadership. Top leadership is responsible for assuring that rules and procedures make sense and facilitate rather than inhibit task performance. This requires input from all levels of the organization to be sure that a proposed rule or policy does not have the unintended consequence of adversely affecting motivation and organizational efficiency. Top leaders also set a tone that can filter throughout the organization in how they operate with individuals in subordinate positions, and this means promoting cooperation and teamwork. Individuals in supervisory positions throughout the organization should be trained in how best to facilitate teamwork, and all employees need to be made aware of how important cooperation is among all employees.

Finally, this research has potential implications for the measurement of constraints. For example, by highlighting those constraints that are the most prevalent, and those that are most harmful for motivation and performance, future measures of constraints may focus on those constraints when creating shorter scales, such as needed for diary designs. Furthermore, measures can be developed that consider constraints to be a multidimensional construct, with subscales focusing on specific categories of constraints, such as coworkers, management, rules/procedures, and clients/customers/patients, as these different sources of constraints might have different implications for organizations.

Concluding remarks

This study is one of very few that examined the complex nature of organizational constraints, and their relationship with performance. While there are many reports of the magnitude of the constraints–performance relationship, few have considered the mechanisms by which constraints might affect performance levels. Using a mixed-methods design, this study found support for indirect effects via motivation and workload and is an important step in understanding the underpinnings of this prevalent stressor.

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Appendix. Examples for each category of responses to the open-ended questions

Q1: Work aspects that are constraining

Co-workers (interruptions, inadequate help or cooperation)

"Unqualified coworkers performing mediocre work"

"Interruptions by others"

Organizational Rules and Procedures

"Following procedure"

"Arbitrary rules"

Supervisor or management

"Lack of support by management"

"Working for a supervisor that is scattered, disorganized"

Poor equipment or lack of money

"Slow computer"

"Lack of budget"

Ambiguous demands (lacking instructions or information)

"Not enough information for design"

"lack of direction in some jobs"

Difficult clients

"Clients not having the information I need"

"Clients are often unreasonable with timeframes"

Workload

"More work and less time"

"Not enough people to do the work"

Conflicting demands

"Dealing with multiple ongoing projects during construction/design phases at a time"

"Multi-tasking has a limit"

Inadequate training or job knowledge

"Training"

"Lack of knowledge or software or training do the job more thoroughly or faster"

Q2: The effect constraints have on motivation

Decrease motivation

“Reduce it often, feel like what’s the use”

“Kill it”

No effect

“I am used to it”

“Not at all”

Increase motivation

“Increase motivation in many cases just to prove that we can get the job done in spite of changes”

“I enjoy the challenges”

Anger or frustration

“They pissed me off”

“Somewhat frustrating”

Depression or stress

“Made me want to throw in the towel”

“Depressing and disappointing, makes me feel not professionally appreciated”

Decrease in work pace

“Slows you down in getting work done by having to explain your approach to problem solving”

“Adds time and resource allocation issues to what otherwise be resolved with a phone-call”

Avoidance of the constraint (work on other things)

“Usually worked around the person /problem (where I could)”

“I find creative ways to reduce the impact of procedures when they do fit the situation.”

Q3: The effect constraints have on performance

Decrease performance

“Causes problems that are difficult to overcome”

“Reduced it somewhat but I just worked my hours”

No effect

“I don’t spend too much time dwelling on those things”

“No real effect on my performance”

Decrease performance pace

“Slow me down”

“Same results, longer time”

Overcome the constraints

“Usually, I cope with it and perform acceptably”

“Found a way to work around them”

Increase performance

“Actually helped improve my overall performance”

“Feedback definitely improves the final product that we produce”

Stress/added pressure/distraction

“Lack of self-worth”

“Lost concentration”

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